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Item 10 of the provisional agenda
Regulation No. 44 (Child restraint systems)

Proposal for Supplement 10 to the 04 series of amendments to Regulation No. 44 (Child restraint systems)

Submitted by the expert from Spain*

The text reproduced below was prepared by the expert from Spain on behalf of the Technical Services Group (TSG) to improve dynamic test provisions for Child Restraint Systems (CRS) and to cope with the presence of load limiters on safety belts used to fix CRS. This text is based on an informal document GRSP-56-06 distributed during the fifty-sixth session of the Working Party on Passive Safety (GRSP). The modifications to the current text of UN Regulation No. 44 are marked in bold for new or strikethrough for deleted characters.

* In accordance with the programme of work of the Inland Transport Committee for 2012–2016 (ECE/TRANS/224, para. 94 and ECE/TRANS/2012/12, programme activity 02.4), the World Forum will develop, harmonize and update Regulations in order to enhance the performance of vehicles. The present document is submitted in conformity with that mandate.

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I. Proposal

Insert new paragraphs 2.41. to 2.43., to read:

"**2.41.** **"*Child Restraint System Displacement system*" means a device enabling the CRS or one of its parts to be displaced angularly or longitudinally.**

2.42. **"*Child Restraint System Locking system*" means a device ensuring that the CRS and its parts are maintained in the position of use.**

2.43. **"*Load limiting device*" means a device that can break or jam under specified loading conditions. The device shall be explicitly designed for these conditions and its behaviour shall be reproducible and objectively documented in the technical documentation.**"

Paragraph 3.2.1., amend to read

"3.2.1. A technical description of the child restraint, specifying the straps and other materials used **together with the predicted and reproducible behaviour of load limiting devices. It shall be** ~~and~~ accompanied by … The description shall mention the colour of the model submitted for approval."

Paragraph 4.3., amend to read:

"4.3. If the restraint … by colour coding. The colours for the safety-belt route to be used when the device is installed forward facing shall be red and when installed rear-facing shall be blue. **Devices that can be installed rearward and forward facing without changing the belt routing (e.g. turnable system) shall use both colours.** The same colours shall also be used on the labels on the device that illustrate the methods of use.

There shall be a clear differentiation …"

"*Paragraph 7.1.4.1.4.*, amend to read

7.1.4.1.4. During the dynamic tests, no part of the child restraint actually helping to keep the child in position shall break, and no buckles or locking system or displacement system **or support leg shall break or** release **or collapse, except where identified as a load limiting device. Any load limiting device shall be clearly identified in the manufacturer's technical descriptions as defined in paragraph 3.2.1. of this Regulation.**"

Paragraph 7.1.4.1.10.1.2., amend to read:

"7.1.4.1.10.1.2. Without the anti-rotation device in use. **If the anti-rotation device is a support leg and it can be completely recessed within the base or the shell of the CRS, the test is conducted with the device in its stowed position or with the leg removed respectively. If it cannot be completely recessed within the base, the test is performed with the device deployed in its shortest length with the trolley floor pan in its lowest position.**

This requirement does not apply when a permanent and non-adjustable support leg is used as an anti-rotation device."

Paragraph 8.1.3.6.3.2., amend to read

"8.1.3.6.3.2. Place the child chair on the test seat.

Place the manikin in the child chair.

For restraints or straps acting directly on a retractor or adult three point safety belt, where no lock off device or any system able to inhibit the action of the retractor is used:

(a) Fit the belt in accordance with the manufacturer's instructions.

(b) Complete the installation of the child chair to the test seat in accordance with Annex 21 to this Regulation.

For all other restraints:

(a) Place a hinged board or a similar flexible device 2.5 cm thick and 6 cm wide and of length equal to the shoulder height (sitting, Annex 8) less the hip centre height (sitting, in Annex 8 popliteus height plus half of thigh height, sitting) relevant to the manikin size being tested between the manikin and the seat back of the chair. The board should follow as closely as possible the curvature of the chair and its lower end should be at the height of the manikin's hip joint.

(b) Adjust the belt in accordance with the manufacturer's instructions, but to a tension of 250 ± 25 N above the adjuster force, with a deflection angle of the strap at the adjuster of 45 ± 5°, or alternatively, the angle prescribed by the manufacturer.

(c) Complete the installation of the child chair to the test seat in accordance with Annex 21 to this Regulation.

(d) Remove the flexible device.

~~Place a hinged board or a similar flexible device 2.5 cm thick and 6 cm wide and of length equal to the shoulder height (sitting, Annex 8) less the hip centre height (sitting, in Annex 8 popliteus height plus half of thigh height, sitting) relevant to the manikin size being tested between the manikin and the seat back of the chair. The board should follow as closely as possible the curvature of the chair and its lower end should be at the height of the manikin's hip joint.~~

~~Adjust the belt in accordance with the manufacturer's instructions, but to a tension of 250 ± 25 N above the adjuster force, with a deflection angle of the strap at the adjuster of 45 ± 5°, or alternatively, the angle prescribed by the manufacturer.~~

~~Complete the installation of the child chair to the test seat in accordance with Annex 21 to this Regulation.~~

~~Remove the flexible device.~~

~~This only applies to harness restraints and to restraints where the child is restrained by the adult three point belt and where a lock off device is used and does not apply to child restraining straps connected directly to a retractor.~~"

Paragraphs 8.2.5.2.6.2. to 8.2.5.2.6.3.2., amend to read:

"8.2.5.2.6.2. The table below sets out the general conditions for each test:

	Load (N)	*Cycles per minute*	*Cycles (No.)*
Type 1 procedure	~~10~~ **≤ 60** ± 0.~~15~~	30 ± 10	1,000 ± 5
Type 2 procedure	~~5~~ **10** ± 0.~~05~~**1**	30 ± 10	5,000 ± 5

~~Where there is insufficient strap to test over 300 mm of shift, the test may be applied over a shorter length subject to a minimum of 100 mm.~~

8.2.5.2.6.3. Particular test conditions

8.2.5.2.6.3.1. Type 1 procedure: for cases where the strap slides through the quick adjusting device. **Apply a load of 10 N, if necessary the load may be increased by 10 N steps so as to permit correct sliding, but limited to a maximum of 60 N. This** ~~The 10 N~~ load shall be vertically and permanently applied on ~~one of~~ the straps. The ~~other~~ **part of the** strap set horizontally **shall pass through the quick adjuster it is fitted to and** shall be attached to a device, giving the webbing a back and forth motion. The **quick** adjusting device shall be so placed that the horizontal strap of the webbing remains under tension (see Annex 5, Figure 1). **Activate the quick adjuster while pulling the straps in the direction to slacken the harness and deactivate it while pulling the straps in the direction to tighten the harness.**

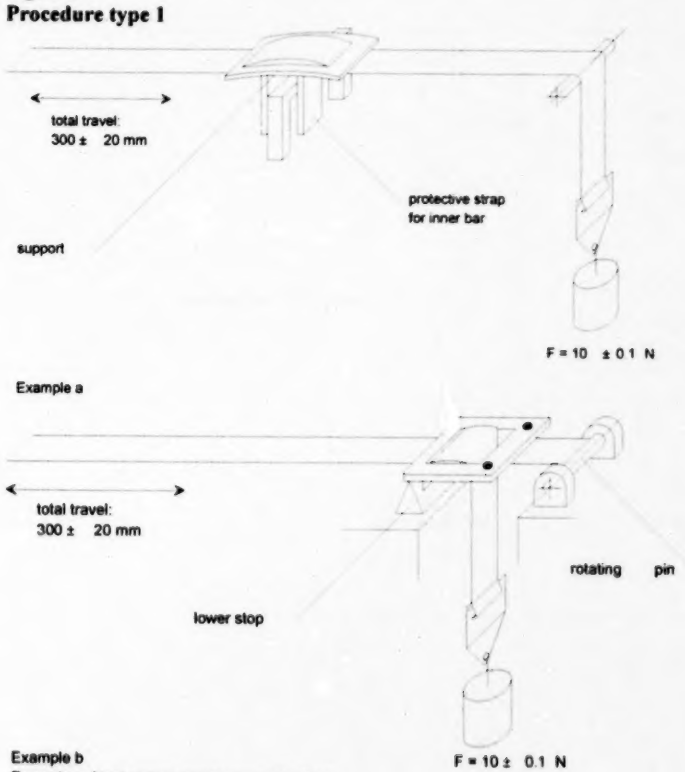
8.2.5.2.6.3.2. Type 2 procedure: for cases where the strap changes direction in passing through a rigid part. During this test, the ~~angles of both~~ webbing ~~straps~~ shall **pass through the rigid part it is intended for and the test set up shall reproduce the angles as in the real installation (in three dimensions), see** ~~be as shown in~~ Annex 5, Figure 2 **for examples**. The ~~5~~ **10** N load shall be permanently applied. For cases where the strap changes direction more than once in passing through a rigid part, the load of ~~5~~ **10** N may be increased **by 10 N steps** so as to **permit correct sliding and** achieve the prescribed 300 mm of strap movement through that rigid part."

Annex 5, amend to read:

"Annex 5

Abrasion and microslip test

Figure 1
Procedure type 1

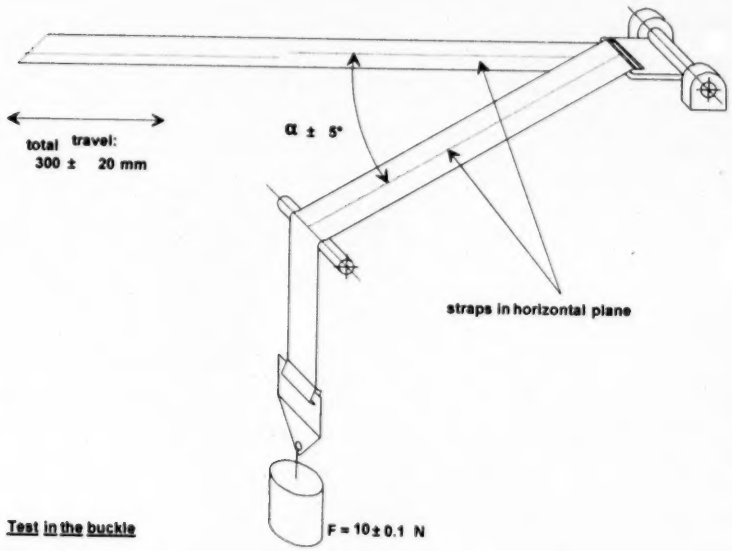


Example b
Examples of test arrangements corresponding
to the type of adjusting device

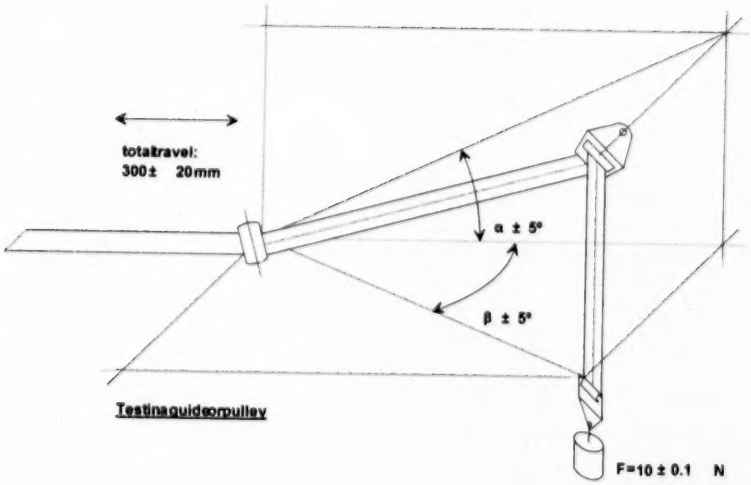
Remark. F = 10 ± 0.1 N, can be increased up to F = 60 ± 0.5 N

Figure 2
Procedure type 2
Following two examples of test set up;

Example 1



Example 2



Where α and β reproduce the angles as in the real installation (in three dimensions).

..."

Annex 15

Insert new explanatory notes on paragraphs 7.1.4.1.4., 7.1.4.1.10.1.2., 8.1.3.6.3.2. and 10.1.3., to read:

"Paragraph 7.1.4.1.4.

The paragraph aims to ensure that the CRS will sustain all imposed loads during the dynamic test, keeping the child in position, by maintaining the original position and configuration. Any change in the original configuration, including change in the reclining position or in the support leg length shall be considered a failure. Any load bearing part or component failure, like adult safety belt contact points (identified as a belt route), anti-rotation device or CRS chair shell shall be considered a failure, except where such behaviour is clearly identified as load limiting device function.

Paragraph 7.1.4.1.10.1.2.

Completely recessed means that with the leg in the stowed position, no part of the leg protrudes beyond the surface of the base or shell, such that it has no effect on the position of the CRS on the test bench. See the following figures for clarification examples.

Figure 1
Examples of completely recessed support leg

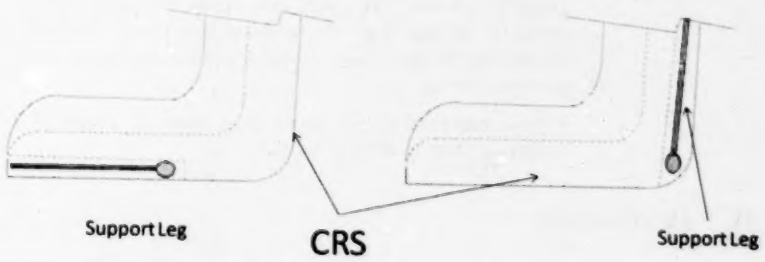
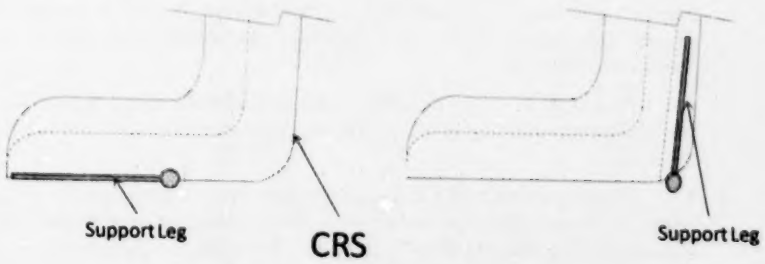


Figure 2
Examples of not completely recessed support leg



Paragraph 8.1.3.6.3.2.

The hinged board or similar flexible device is intended to simulate the removal of clothing from the child and a failure to re-adjust the harness system. Where the child is restrained by a system that adjusts to fit the child's physique without external intervention (where the adult belt is used or the harness contains automatic or emergency locking retractors), it shall not be necessary to use the hinged board. For child restraint systems where the length of the straps can be fixed (for example a harness without retractors or the adult belt is used with a lock-off), the use of the hinged board is required. The hinged board must be used for the setup of CRS using belted impact shields.

Paragraph 10.1.3.

10.1.3. **In the case of extensions where the modifications affect only one CRS group, perform extension test only for that group, and if the excursion result is worse than for the previous worst case for the CRS (from any group from the original approval or previous extensions) then conduct new production qualification tests. If the head excursion is no worse than any other previous approval or extension testing (excluding PQ tests) further production qualification testing is not required.**

In cases where the extension modifications affect more than one group, for example if extending a group 2/3 CRS to add group 1, but the modification can affect group 2/3 (e.g.: strengthening), than perform group 1 tests and the worst case group 2/3 (original approval). If any result is worse than the original approval or previous extension (excluding PQ tests) then perform production qualification tests on the new worst case.

Always compare to the worst case from all approval and extension testing (excluding any PQ tests)."

II. Justification

1. Paragraphs 2.41. to 2.43.: Proposal to clarify failures during dynamic test.

2. Paragraphs 3.2.1. and 7.1.4.1.4., and explanatory note on paragraph 7.1.4.1.4. of Annex 15: The current text does not define CRS displacement or locking systems and does not clearly states if their failures have to be considered a failure or not. Proposed modification introduced these definitions, adding clearer failure specifications, to the support leg as well. The possibility to use "load limiting device" as in Regulation No. 129 has also been considered. Annex 15 has been also amended to introduce an explanatory note on this matter.

3. Paragraph 4.3.: Colour coding for products that can change installation direction in the vehicle without changing the belt routing (e.g. turnable system) was not covered by the text.

4. Paragraph 7.1.4.1.10.1.2. and explanatory note on paragraph 7.1.4.1.10.1.2. under Annex 15: Better definition on how to perform misuse test was needed. Introduced text aims at clarifying how to perform misuse test when a support leg is used.

5. Paragraph 8.1.3.6.3.2.: The original text did not describe the set up for CRS restraining the child using adult safety belt or retractors. The modification includes this condition adding some clarification for particular cases.

6. Paragraphs 8.2.5.2.6. to 8.2.5.2.6.3.2.: Introduced modification intend to better reproduce real life functioning and to clarify test procedure. Applied load has been increased to exceed maximum allowed resistance to permit sliding of the strap through the quick adjuster and through rigid parts; tolerances have been increased accordingly; option for shorter shift has been removed since it is unnecessary (test on strap, not on complete component); drawings modify to be consistent with the text.

7. Annex 5: Drawing modified to be consistent with new paragraphs 8.2.5.2.6. to 8.2.5.2.6.3.2.

8. Annex 15, explanatory note on paragraph 10.1.3.: Clarification about how to handle extension test results to ascertain whether a further PQ test is needed was deemed necessary.